

What is claimed is:

1 1. An apparatus for controlling movement comprising:
2 a moveable member for movement along a fixed path of travel
3 between first and second end limits of movement;
4 first means including a reversible electric motor for selectively
5 driving the moveable member in a first direction and in a second direction
6 opposite from the first direction along the fixed path of travel;
7 at least one sensor disposed between the first means and the
8 moveable member for generating at least one input signal corresponding to
9 motion of the moveable member along the fixed path of travel; and
10 control means responsive to said at least one input signal for
11 selectively actuating said first means in accordance with a control program.

1 2. The apparatus of claim 1 further comprising:
2 said at least one sensor positioned with respect to the
3 moveable member for generating said at least one input signal, said at least
4 one input signal including a position input signal to the control means
5 representative of a first end limit of movement position and a second end
6 limit of movement position of the moveable member.

1 3. The apparatus of claim 1 further comprising:
2 a control signal generator for generating said at least one input
3 signal, said at least one input signal including an operator input signal to the
4 control means in response to operator input.

1 4. The apparatus of claim 1 further comprising:
2 said at least one sensor for generating said at least one input
3 signal, said at least one input signal including an actual position input signal
4 to the control means representative of an actual position of the moveable

1 8. The apparatus of claim 1 further comprising:
2 a clutch disposed between the reversible electric motor and the
3 moveable closure;

4 a motion sensor mounted to a portion of the clutch for sensing
5 movement of the clutch when the moveable member moves along the fixed
6 path; and
7 the control means including means for controlling a speed of
8 the moveable member while moving between a first position and a second
9 position along the fixed path in response to said motion sensor mounted to
10 the portion of the clutch disposed between the reversible electric motor and
11 the moveable member.

1 9. The apparatus of claim 1 further comprising:
2 a clutch disposed between the reversible electric motor and the
3 moveable member;
4 a motion sensor mounted to a portion of the clutch for sensing
5 movement of the clutch when the moveable member moves along the fixed
6 path; and
7 the control means including means for detecting an obstruction
8 along the fixed path of the moveable member while the moveable member is
9 moving between a first position and a second position in response to said
10 motion sensor connected to the portion of the clutch disposed between the
11 reversible electric motor and the moveable member.

1 10. An apparatus for controlling movement comprising:
2 a moveable member for movement along a fixed path of travel
3 between a first end limit of movement and a second end limit of movement;
4 a reversible translator for selectively driving the moveable
5 member in a first direction and in a second direction opposite from the first
6 direction along the fixed path of travel;
7 at least one sensor disposed between the translator and the
8 moveable member for generating at least one input signal corresponding to
9 motion of the moveable member along the fixed path of travel; and

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10 a programmable controller responsive to said at least one input
11 signal for selectively regulating speed of the translator in accordance with a
12 control program.

1 11. The apparatus of claim 10 further comprising:
2 said translator including a reversible electric motor;
3 a clutch disposed between said motor and said moveable
4 member;

5 said at least one sensor including a motion sensor operably
6 positioned with respect to said clutch for sensing movement of the clutch in
7 response to movement of the moveable member; and

8 means for detecting an obstruction along a fixed path of the
9 moveable member while the moveable member is moving between the first
10 and second end limits of movement in response to said motion sensor
11 operably positioned with respect to the clutch disposed between the
12 reversible electric motor and the moveable member.

1 12. The apparatus of claim 10 further comprising:
2 a striker movable between a first position and a second
3 position, the striker operably engagable with the moveable member when the
4 moveable member is in proximity with the first end limit of movement along
5 the fixed path;

6 a second translator for selectively driving the striker between
7 the first position to engage the moveable member with a frame and the
8 second position where the moveable member is disengaged with respect to
9 the frame; and

10 said at least one sensor including a position sensor disposed
11 with respect to the second translator for generating at least one input
12 position signal, said at least one input position signal including an engaged-
13 disengaged input signal to the controller representative of the first position
14 and the second position.

1 16. The apparatus of claim 14 further comprising:
2 a clutch disposed between the motor and the moveable
3 closure;
4 a obstruction sensor mounted to a portion of the clutch for
5 sensing movement of the clutch when the moveable closure moves along the
6 fixed path; and
7 the control means including means for detecting an obstruction
8 along the fixed path of the moveable closure while the moveable closure is
9 moving between the first end limit of movement and the second end limit of
10 movement in response to said obstruction sensor connected to the portion of
11 the clutch disposed between the motor and the moveable closure.

1 17. The apparatus of claim 14 further comprising:
2 said at least one sensor including a current sensor for sensing
3 an amount of current supplied to the motor and for generating a sensed
4 current signal; and
5 means for controlling speed of the moveable closure between a
6 predetermined minimum speed and a predetermined maximum speed while
7 moving between the first and second end limits of movement along the fixed
8 path in response to the sensed current signal from the current sensor.

1 18. The apparatus of claim 14 further comprising:
2 said at least one sensor including a current sensor for sensing
3 an amount of current supplied to the motor and for generating a sensed
4 current signal; and
5 means for detecting an obstruction in response to the sensed
6 current signal from the current sensor.

1 19. The apparatus of claim 14 further comprising:

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2 said at least one sensor including a position sensor for sensing
 3 a parameter corresponding to an actual position of the moveable closure
 4 anywhere along the fixed path and for generating an input signal to the
 5 control means representative of an actual position of the moveable closure
 6 along the fixed path as the moveable closure is moved between the first and
 7 second end limits of movement.

1 *Sub 7* 20. A method for controlling movement of a moveable member,
 2 the method comprising the steps of:

3 selectively driving the moveable member in a first direction and
 4 in a second direction opposite from the first direction with first means
 5 including a reversible electric motor;

6 generating at least one input signal corresponding to motion of
 7 the moveable member along the fixed path of travel with at least one sensor
 8 positioned between the first means and the moveable member; and
 9 selectively actuating said first means with control means
 10 responsive to at least one input signal in accordance with a control program.

1 21. The method of claim 20 further comprising the step of:
 2 generating said input signal with at least one sensor positioned
 3 with respect to the moveable member, said input signal including an input
 4 signal to the control means representative of a first position and a second
 5 position of the moveable member.

1 22. The method of claim 20 further comprising the step of:
 2 generating said input signal with a control signal generator,
 3 said input signal including an input signal to the control means in response
 4 to operator input.

1 ~~23. The method of claim 20 further comprising the step of:~~

2 generating said input signal with at least one sensor positioned
 3 between the moveable member and the first means, said input signal
 4 including an input signal to the control means representative of movement of
 5 the moveable member along a fixed path of travel.

1 24. The method of claim 20 further comprising the step of:
 2 generating said input signal with at least one sensor, said input
 3 signal including an input signal to the control means representative of an
 4 actual position of the moveable member along a fixed path of travel between
 5 a first position and a second position.

1 25. The method of claim 20 further comprising the step of:
 2 selectively driving a member-engaging member between a first
 3 position to engage the moveable member with a frame and a second position
 4 where the moveable member is disengaged with respect to the frame with
 5 second means including a second electric motor; and
 6 generating said input signal with at least one sensor positioned
 7 with respect to the second means, said input signal including an input signal
 8 to the control means representative of the first position and the second
 9 position.

1 26. The method of claim 25 further comprising the step of:
 2 generating said input signal with at least one sensor positioned
 3 with respect to the frame and the moveable member, said input signal
 4 including an input signal to the control means representative of a moveable
 5 member ajar condition.

1 27. The method of claim 20 wherein the control means further
 2 comprises the steps of:

3 receiving said at least one input signal with a central
 4 ~~processing unit; and~~

5 generating at least one output signal in accordance with the
6 control program stored in memory.

1 28. The method of claim 20 wherein the control means further
2 comprises the step of:

3 controlling a speed of the moveable member while moving
4 between a first position and a second position in response to said input
5 signal from the first means, wherein the first means includes a sensor
6 mounted to a portion of a clutch disposed between the reversible electric
7 motor and the moveable member.

1 29. The method of claim 20 wherein the control means further
2 comprises the step of:

3 detecting an obstruction along a fixed path of the moveable
4 member while the moveable member is moving between an first position and
5 a second position in response to said input signal from the first means,
6 wherein the first means includes a sensor connected to a portion of a clutch
7 disposed between the reversible electric motor and the moveable member.

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